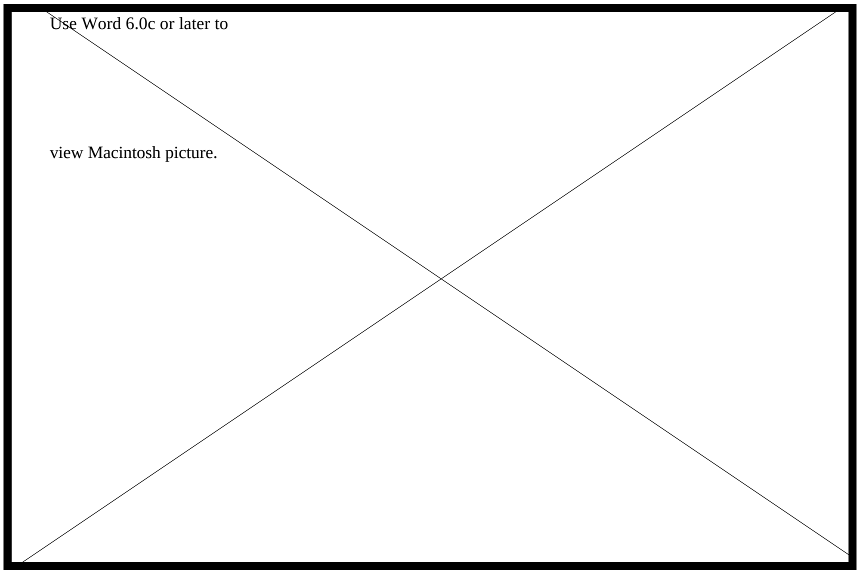


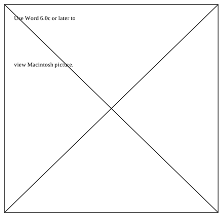
Department of Defense

High Level Architecture

Federation Development and Execution Process (FEDEP) Model

Version 1.1

9 December 1997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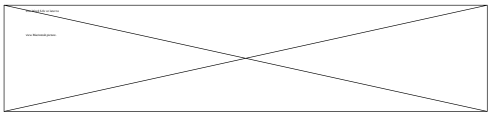
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FOREWORD

The formal definition of the Department of Defense High Level Architecture (HLA) comprises three main components: the HLA Rules, the HLA Interface Specification, and the HLA Object Model Template (OMT). These components are documented in the following reports:

- **HLA Rules V1.2**
- **HLA Interface Specification V1.2**
- **HLA Object Model Template V1.2**

This document, the HLA Federation Development and Execution Process (FEDEP) Model, is intended to identify and describe the sequence of activities necessary to construct HLA federations. This version of the HLA FEDEP Model has been heavily influenced by the experiences of the HLA protofederations and other hands-on developers of HLA applications. In all cases, the development methodologies and approaches used to support each individual application area have been studied and evaluated, and "best practices" merged into a single, broadly applicable, high-level framework for HLA federation development and execution. This document is one element in the HLA Technical Library of information sources of general relevance to developing and executing HLA federations.

1. PURPOSE

The Department of Defense (DoD) Modeling and Simulation Master Plan [DOD95] calls for the establishment of a DoD-wide High Level Architecture (HLA) for modeling and simulation (M&S), applicable to a wide range of functional applications. The purpose of this architecture is to facilitate interoperability among simulations and promote reuse of simulations and their components.

A named set of simulations interacting via the services of the HLA Runtime Infrastructure (RTI) and in accordance with a common object model and a common HLA rule set is known as a HLA *federation*. The purpose of this document is to describe a high-level process by which HLA federations can be developed and executed to meet the needs of a federation sponsor. It is expected that the guidelines and recommended practices described in this document are generally relevant to and can facilitate the development of most HLA federations.

2. INTRODUCTION

One of the design goals identified early in the development of the HLA stated the need for a high degree of flexibility in the process by which HLA applications could be composed to achieve the objectives of particular applications. Because of this basic desire to avoid mandating unnecessary constraints on how HLA applications are constructed, it was recognized and accepted that the actual process used to develop and execute HLA federations could vary significantly within or across different user communities. For instance, the types and sequence of low-level activities required to develop analysis-oriented federations is likely to be quite different than those required to develop distributed training exercises. However, at a more abstract level, it is possible to identify a sequence of very basic steps that all HLA federations will need to follow to develop and execute their federations. This five step process is shown in Figure 2-1, and is summarized below:

- *Step 1*: The federation sponsor and federation development team must define and agree on a set of objectives, and document what must be accomplished to achieve those objectives.
- *Step 2*: A representation of the real world domain of interest (entities and tasks) is developed, and described in terms of a set of required objects and interactions.
- *Step 3*: Federation participants are determined (if not previously identified), and a FOM is developed to explicitly document information exchange requirements and responsibilities.
- *Step 4*: All necessary federation implementation activities are performed, and testing is conducted to ensure interoperability requirements are being met.
- *Step 5*: The federation is executed, outputs analyzed, and feedback provided to the federation sponsor.

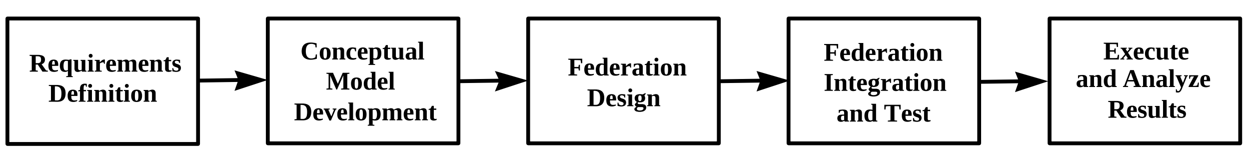

Figure 2-1. Five-Step Process

Since this five-step process can be implemented in many different ways depending on the nature of the application, it follows that the time and effort required to build an HLA federation can also vary significantly. For instance, it may take a large team of developers and functional area experts several weeks to fully define the real world domain of interest (Step 2) for very large, complex applications. In smaller, relatively simple applications, the same activity could potentially be conducted in a day or less. Differences in the degree of formality desired in the development process can also lead to varying requirements for time and personnel resources.

This document describes a highly structured, systems engineering approach to federation development known as the HLA Federation Development and Execution Process (FEDEP). Although the intention is to define a comprehensive, generalized framework for HLA federation construction, it is important to recognize that users of this process model will normally need to adjust and modify the FEDEP as appropriate to address the unique requirements and constraints of their particular application area. That is, although the FEDEP provides a valid representational view of how the five-step process could be implemented; other views are possible and equally valid.

For whatever view of the federation development process is ultimately chosen, an important concern in the process must be the credibility of the system/environmental representations which constitute the federation. The establishment of credibility is supported by the activities which correspond to verification, validation, and accreditation (VV&A). To be most effective, V&V activities should be closely tied to the development and test processes and should be performed at the federate and federation levels. Accreditation, a policy-related activity, is generally performed by the user/sponsor and designates their acceptance of the federation and its associated results for an intended application. As with the federation development process, any and all VV&A activities need to be tailored to meet user needs, credibility requirements, and resource constraints. Activities related to VV&A and also to security issues which affect the federation development process will be highlighted throughout this document.

3. FEDEP MODEL

The Federation Development and Execution Process (FEDEP) Model describes a high-level framework for the development and execution of HLA federations. The intent of the FEDEP Model is to specify a set of recommended practices and guidelines for federation development and execution that federation developers can leverage to achieve the needs of their application.

The structure of the FEDEP model is shown in Figure 3-1, with a mapping of FEDEP activities to the five-step process shown in Table 3-1. Although the activities represented in the FEDEP diagram appear highly sequential in nature, the intention is not to suggest a strict waterfall approach to federation development. Rather, this process illustration is simply intended to highlight the major activities that occur during federation development and approximately when such activities are first initiated relative to other federation development activities. In fact, experience has shown that many of the activities shown in Figure 3-1 as sequential are actually cyclic and/or concurrent. Users of the FEDEP should be aware that the activities described in this document, while being generally applicable to most HLA federations, are intended to be tailored to meet the needs of each individual application. Federation developers should generally expect to utilize and leverage the FEDEP view as a starting point for whatever specific approach to federation development is deemed most appropriate rather than strictly adhering to the FEDEP process descriptions in all situations.

3.1 Sponsor Needs Identification

The primary purpose of Sponsor Needs Identification is to develop a formalized problem statement. The sponsoring agency is responsible for preparation of this product. The needs statement should include, at a minimum, high-level descriptions of critical systems of interest, coarse indications of required fidelity and resolution for simulated entities, and output data requirements. In addition, the federation sponsor should also indicate the resources which will be available to support the federation (funding, personnel, tools, facilities, …) and any known constraints which may affect how the federation is developed (due dates, security requirements, …). In general, the federation sponsor should always include as much detail and specific information as is possible at this early stage of development.

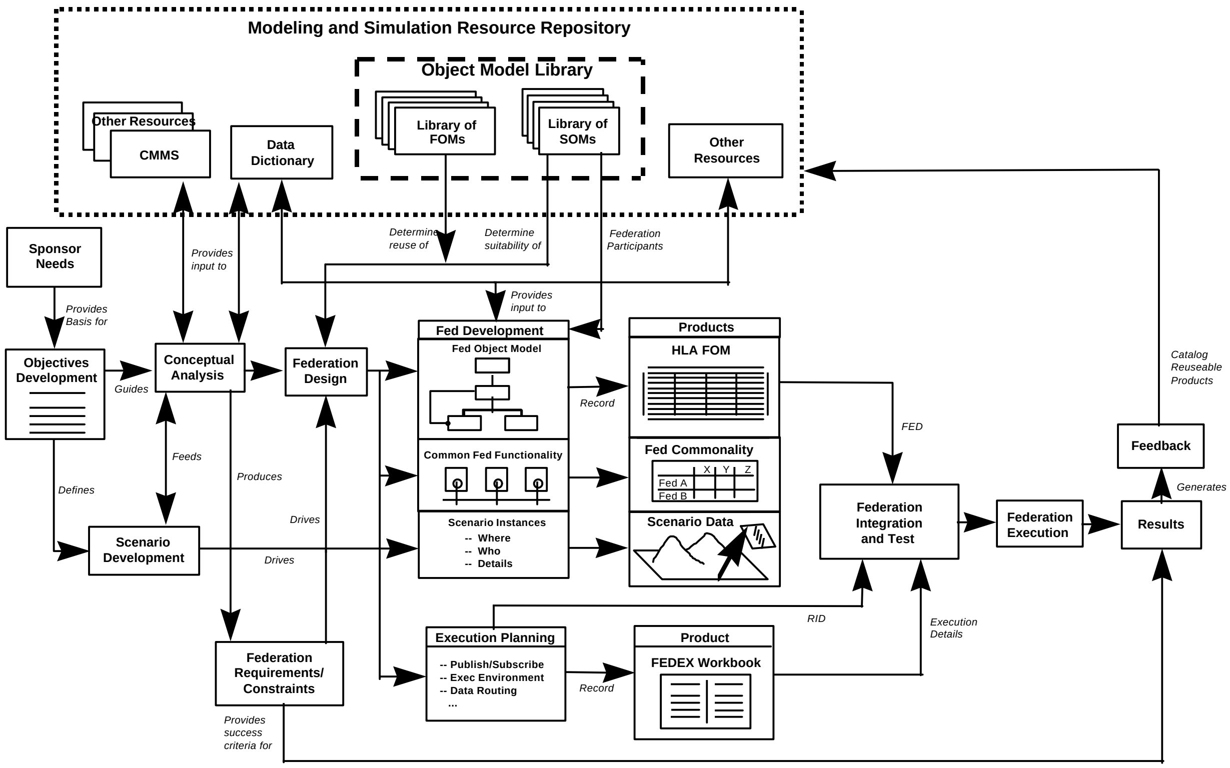

Figure 3-1. Federation Development and Execution Process Model

Requirements Definition	Conceptual Model Development	Federation Design	Federation Integration and Test	Execute and Analyze Results
Sponsor Needs Identification Objectives Development	Scenario Development Conceptual Analysis	Federation Design Federation Development	Execution Planning Federation Integration and Test	Federation Execution Results and Feedback

Table 3-1. Mapping of FEDEP to Five-Step Process

An explicit and unambiguous statement of sponsor needs is critical to achieving clear communication of intent between the federation sponsor and the ultimate developers of the federation. Such communication is essential to the development effort and associated VV&A and test activities. Failure to establish a common understanding of the required product can result in costly rework in later stages of the federation development process.

3.2 Objectives Development

The purpose of Objectives Development is to refine the Sponsor Needs statement into a more detailed set of specific objectives for the federation. The Objectives Statement is intended as a foundation for federation requirements generation, translating high-level sponsor expectations into more concrete, measurable federation goals. This activity requires close collaboration between the federation sponsor and federation development team to ensure that the resulting objectives meet the sponsor needs. Examples of the types of information which would be documented as a result of this activity would include:

- A prioritized list of measurable objectives for the federation
- Verification data that confirms that the federation objectives achieve sponsor needs
- A federation development plan showing an approximate schedule and major milestones
- A configuration management plan
- Operational context constraints or preferences, including geographical regions, environmental conditions, threats, and tactics
- Identification of security position, including estimated security level and possible designated approval authority (or authorities, if a single individual is not possible)
- The use of government/sponsor furnished equipment, facilities, and data
- Initial VV&A/test plans

Early assessments of federation feasibility should also be performed during Objectives Development. In particular, certain objectives may not be achievable given practical constraints (such as cost, schedule, availability of personnel or facilities, …) or even limitations on the state-of-the-art of needed technology. Early identification of such issues and consideration of these limitations and constraints in the Objectives Statement will remove obstacles to successful federation development.

Finally, the issue of tool selection to support scenario development, conceptual analysis, VV&A and test activities, and configuration management should be addressed prior to concluding the Objectives Development activity. This decision is made by the federation development team on the basis of tool availability, cost, applicability to the given application, and the personal preferences of the participants. The ability of a given set of tools to exchange federation data is also an important consideration.

3.3 Scenario Development

The purpose of this phase is to develop a functional specification of the federation scenario. The primary input to this activity is the operational context constraints specified in the Objectives Statement. The composition of a federation scenario includes an identification of the major entities that must be represented by the federation, a functional description of the capabilities, behavior, and relationships between these major entities over time, and a specification of relevant environmental conditions which impact or are impacted by entities in the federation. Initial and termination conditions should also be provided. Multiple scenarios may be developed during this phase, depending on the needs of the federation. A single scenario may also support multiple vignettes, each representing a temporally ordered set of events and behaviors. The completed specification of the federation scenario(s) provides a bounding mechanism for validation and test activities, and may necessitate changes to the security level at which the federation operates.

The presentation style used during scenario construction is at the discretion of the federation developers. Textual scenario descriptions, event-trace diagrams, and graphical illustrations of force laydowns and communication paths all represent effective means of conveying scenario information. Graphical scenario development tools can generally be configured to produce any of these presentation forms. Reuse of existing scenario databases may also facilitate the Scenario Development activity.

3.4 Conceptual Analysis

During the Conceptual Analysis phase, the federation developer produces a conceptual representation of the intended problem space based on his/her interpretation of user needs, federation objectives, and the defined environment. The product resulting from this phase is known as a *federation conceptual model*. The federation conceptual model is an implementation-independent representation which serves as a vehicle for transforming objectives into functional and behavioral capabilities, and provides a crucial traceability link between the federation objectives and the design implementation. The conceptual model can be used as the structural basis for the overall design and development of the federation, and can highlight correctable problems early in the federation development process when properly validated.

From the perspective of Object-Oriented (OO) software system designers, the federation conceptual model is comparable to the notion of a traditional object model. That is, the focus of federation conceptual model development is to utilize the federation scenario as a means of identifying federation objects, identifying static and dynamic relationships between object classes, and identifying the behavioral and transformational (algorithmic) aspects of each class of object. Static relationships can be expressed as ordinary associations, or as more specific types of associations such as generalizations ("is-a" relationships) or aggregations ("part-whole" relationships). Dynamic relationships should include (if appropriate) the specification of temporally ordered sequences of object interactions with associated trigger conditions. Object characteristics (attributes) and interaction descriptors (parameters) may also be identified to the extent possible at this early stage of design. While other conceptual modeling approaches may be also used which are less object-oriented in nature, it is important that the real world domain to be represented in the federation is expressed in terms of objects and object interactions.

A critical resource in the development of the federation conceptual model is the Conceptual Models of the Mission Space (CMMS). The CMMS provides both a mission space structure and a set of tools and resources to permit specification of the entities, tasks, interactions, and environmental impacts which comprise the defined mission space. A second critical resource for conceptual model development is the HLA Object Model Data Dictionary (OMDD) which provides a common set of names and semantics for elements of HLA object models. The standard terminology defined in the OMDD should be utilized in the conceptual model whenever possible to minimize data translation during transition to Federation Object Model (FOM) development.

As the federation conceptual model evolves, it will greatly facilitate the federation developer's understanding of the real world domain. As this knowledge is acquired, a set of detailed federation requirements can be developed. These requirements, based on the original Objectives Statement, should be directly testable and provide the implementation level guidance needed to design and develop the federation. The federation requirements should also explicitly address the issue of fidelity, so that fidelity requirements can be considered during selection of federation participants. In addition, any programmatic or technical constraints on the federation should be refined and described to the degree of detail necessary to guide federation implementation.

There are many readily available commercial software tools which can capture most aspects of the federation conceptual model. Other tools may be appropriate to maintain consistency between the federation conceptual model, the federation scenario, and the CMMS, and also to provide traceability to the federation requirements. Still other tools may be used to document appropriate elements of the federation conceptual model in the HLA Object Model Template (OMT) formats. When the OMT formats are used in this phase of development, the resulting object model can be considered to be an "Ideal FOM", or a FOM whose specification is independent of whether there currently exists a combination of federates that can support it.

Although the object model description is likely to be incomplete at this point, it can still provide a valuable starting point for FOM development later in the federation development process.

At the conclusion of this activity, the federation conceptual model and federation requirements are presented to the federation sponsor for approval before the onset of Federation Design. Revisions to the original Objectives Statement may be defined and implemented as a result of this feedback.

3.5 Federation Design

The primary purpose of Federation Design is to establish the membership of the federation, and to define a formalized, lifecycle systems engineering approach for developing and implementing the federation. The federation requirements, the federation scenario description, and the federation conceptual model provide the necessary foundation to begin Federation Design.

The first activity in this phase is to assess the possibility of reusing existing FOMs that have been previously developed for different but similar applications. The federation conceptual model and “Ideal FOM” provide the basis for this determination. The HLA Object Model Library (OML) supports web-based access to repositories of HLA object models, and possesses sophisticated browsing and searching features to facilitate this assessment. It is important to recognize that, when considering the reuse potential of an existing FOM, the developer must understand any underlying assumptions and/or constraints inherent to that FOM which may impact the federation under development.

Most reuse opportunities are expected to be partial, meaning that subsets of existing FOMs can be extracted and combined to form a baseline FOM framework. Although the contents of the framework will be incomplete at this stage, the reuse and integration of “piece parts” from existing FOMs is generally preferable to starting from scratch.

The next major activity is to determine the suitability of individual simulation systems to become members of the federation. This is normally driven by the perceived ability of potential federation members to represent required objects and interactions at an appropriate level of fidelity. In some instances, federation membership may be at least partially predetermined by the federation sponsor. Other managerial constraints (e.g., availability, security, facilities) and technical constraints (e.g., VV&A status, SOM incompatibilities) may also influence selection of federation members. The same HLA OML searching and browsing features used to identify reusable FOMs may be used to search electronic libraries of SOMs for candidate simulations, keyed to critical objects and interactions of interest. Reuse of existing FOMs may also facilitate the identification of potential federation members. Pointers to more detailed design information in selected SOMs will expedite the final selection process for federation membership.

For secure federations, efforts associated with maintaining a secure posture during the federation lifecycle can begin once federation membership has been established. A security point of contact and/or federate security representatives must be designated, which may be part-time roles depending on the size and complexity of the execution. A security risk assessment and concept of operations may be developed to clarify the security level and mode of operation established earlier in the FEDEP.

The last major activity in the Federation Design phase is to build a formalized, collaborative approach to federation development and integration. This generally requires face-to-face communication among all federation participants to ensure a common understanding of federation goals and requirements, and also to negotiate an appropriate systems engineering methodology across the federation along with a common representational schema. When the federation represents a modification or extension to a previous federation, new federates must be made cognizant of all previously negotiated agreements within that earlier federation, and given the opportunity to revisit pertinent technical issues. Agreements must also be reached among the federates regarding the software tools that will be used to support the remaining lifecycle of the federation (CASE, configuration management, VV&A, testing, …), and how the execution(s) will be designed to generate the required output data. For federations with stochastic factors, this should include experimental design to control variability (e.g., variance reduction techniques), and must include determining the number of replications of the execution that are required to achieve desired confidence intervals. These agreements, along with a detailed workplan, must be documented for later reference and possible reuse in other federations.

3.6 Federation Development

The purpose of the Federation Development phase is to develop the FOM, and to negotiate other products and resources that will be common across the federation. There are several different fundamental approaches to FOM development, all of which have unique advantages depending on the particular situation. These approaches include:

- Constructing the FOM from the “bottom up”, using the OMDD and the federation conceptual model (including the “Ideal FOM”).
- Merge together SOMs of all participating federates, removing those aspects of the SOMs which do not apply to the domain of interest.

- Begin with the SOM that most closely aligns with the desired FOM, remove those aspects of the SOM which do not apply to the domain of interest, and merge-in elements of other SOMs to fully represent domain.
- Begin with a FOM(s) from a previous, but similar, application. Modify and/or augment as required.
- Begin with a FOM that provides a common frame of reference to a given user community. Remove elements of the FOM that are not required for the application. Modify and/or augment only if necessary.

While each of these last four approaches may represent a somewhat more efficient FOM development strategy (relative to starting entirely from scratch) under certain circumstances, all will require some use and appropriate tailoring of the essential activities described in the current HLA Object Model (OM) Development Process [SIW97]. A summary of these activities is provided in Figure 3-2. Federation security personnel must always maintain knowledge of any classified information associated with applicable entries in each federates SOM, and the implications when this data is combined into a single FOM.

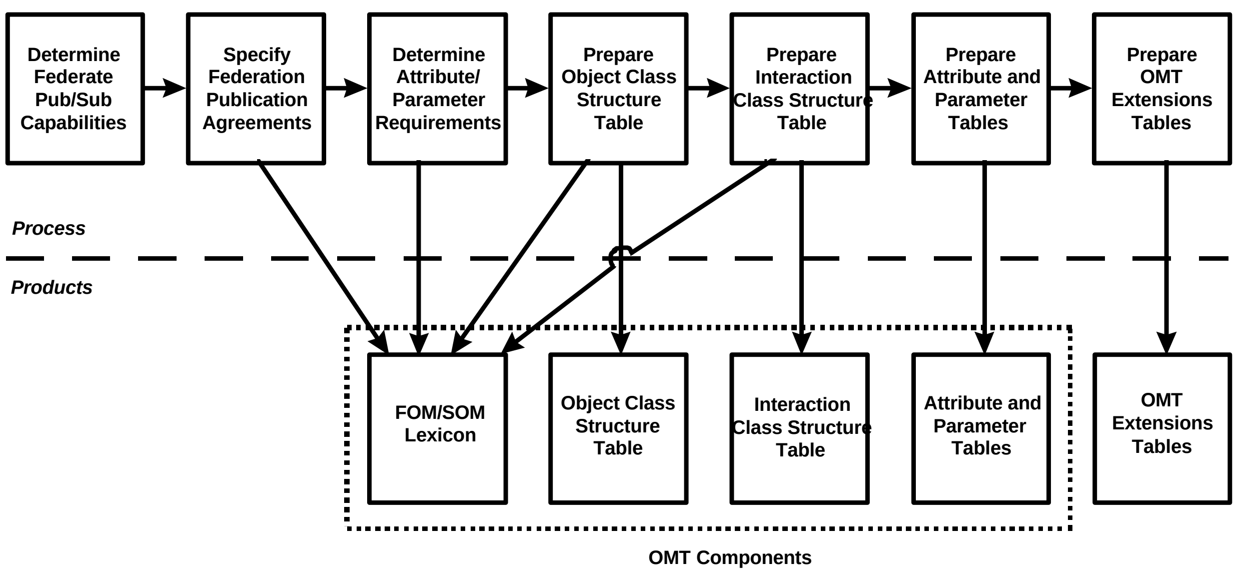

Figure 3-2. FOM Development Process

The use of automated tools to facilitate the object model development process is strongly encouraged. As discussed earlier, the HLA OML provides user access to libraries of reusable object models which can be used either as a starting framework or as individual “piece parts” for a new FOM. In addition, Object Model Development Tools (OMDTs) may be used to modify or extend an existing object model, or to build an entirely new object model from scratch. Other

OMDT features include consistency checking, syntax checking, Federation Execution Data (FED) file generation, external interfaces to commercial object model development tools, and an on-line users manual.

In addition to FOM development, there are other important activities that take place in this phase of the FEDEP. Negotiations must take place among federation members and agreements reached regarding supporting resources that will be common across the federation. For instance, decisions must be made regarding any databases (e.g., environmental) or algorithms (e.g., line-of-sight) that must be common across all federation participants. Another important activity is to transition the functional description of the scenario (developed in an earlier phase) to an actual scenario instance (or set of instances) based on authoritative data sources. The output of this last activity permits federation testing to be conducted directly within the context of the domain of interest, and also drives the execution of the federation later in the FEDEP.

3.7 Execution Planning

The purpose of this phase is to define and develop the full set of information required to support an HLA federation execution. The main activity in this phase is to document the template of information described in the Federation Execution (Fedex) Planning Workbook. This workbook provides a structured mechanism for describing the performance requirements and capabilities of the HLA Runtime Infrastructure (RTI), and also to define expected performance of other components of HLA federations, including federate performance, host requirements, and network requirements. The workbook itself is partitioned into the following five tables.

Federation Execution Summary Table: The table describes certain key information about the Fedex (name, number of concurrent Fedexs, …) and summary information about each participating federate (API used, settings of time management switches, …).

Host Table: This table describes key information on the hardware, software, and capacity of the hosts which support the Fedex.

LAN Table: This table describes key information on each LAN/WAN used in the Fedex, including network connections.

RTI Services Table: This table lists the current suite of RTI services and identifies any service which is used (at least once) in the fedex.

Object/Interaction Table: This table identifies the publishing responsibilities of federates at the attribute level, including update rates and groupings. This table also identifies update latency constraints for attribute subscribers. Similar data is also recorded for interactions.

Collectively, the five tables in this workbook provide all of the execution-specific information needed by a federation developer to operate the federation. Federation performance requirements documented in these tables may also necessitate some modifications to the RTI Initialization Data (RID) file associated with the specific RTI implementation being used in this federation. The workbook and modified (if required) RID file, taken together with the completed FOM and associated FED file, provide all of the information necessary to transition into the Federation Integration and Testing phase of federation development.

An additional activity in this phase for secure federations is to develop a security test and evaluation plan. This task requires reviewing and verifying the security work accomplished thus far in the federation development, and finalizing the technical details of security design, such as downgrading rules, formalized practices, etc.. This plan represents an important element of the necessary documentation set for the federation.

3.8 Federation Integration and Test

The purpose of this phase is bring all of the federation participants into a unifying logical operating environment to test that the federates can interoperate to the degree required to achieve federation objectives. There are three levels of testing defined for HLA applications, which are described as follows:

Compliance Testing: In this activity, each federate is tested individually to ensure that the federate software correctly implements the HLA requirements as documented in the HLA Compliance Checklist.

Integration Testing: In this activity, the federation is tested as an integrated whole to verify a basic level of interoperability. This primarily includes observing the ability of the federates to exchange data as described by the FOM.

Federation Testing: In this activity, the ability of the federation to interoperate to the degree necessary to achieve federation objectives is tested. This includes observing the ability of federates to interact according to the defined scenario and to the level of fidelity required for the application. This activity also includes security certification testing if required for the application.

Procedures for conducting Integration and Federation Testing must be agreed upon by all federation participants, and documented in a formal test plan. In practice, iterative “test-fix-test” approaches throughout federation integration are widely used, and have been shown to work quite well. Data collection strategies must be implemented during Federation Testing to ensure that attribute updates and interactions are transmitted in the correct formats under the right conditions. The HLA Management Object Model may be used during Integration/Federation Testing to provide useful information on the operation of the RTI, individual federates, and the integrated federation.

The desired output from this phase is a set of testing data which, once evaluated, indicates that execution of the federation can commence. Early testing data may uncover obstacles to successful federation integration, for which corrective actions are required on the part of federate or federation developers. In many cases, these corrective actions simply require a relatively minor software fix (or series of fixes) or minor adjustment to the FOM. However, in some cases, more significant integration problems may be identified that require either extensive software modifications or revisiting decisions on the selection of the federates themselves. In these cases, identification of options with associated estimates on cost and schedule (including security and VV&A implications) should be prepared and discussed with the federation sponsor before corrective action is taken.

3.9 Federation Execution

The purpose of this phase is to exercise all federation participants as an integrated whole to generate required outputs and thus achieve stated federation objectives. Successful federation testing is the primary pre-condition to this phase. Besides executing the federation in a coordinated fashion over time, the two principal activities in this phase are execution management and data collection. This first activity involves controlling and monitoring the execution via specialized software tools (as appropriate). Execution monitoring can be performed at the hardware level (CPU usage, network load, …), or software operations can be monitored for individual federates or across the full federation. Data collection is focused on assembling the desired set of output, and on collecting whatever additional supporting data is required to assess the validity of the federation execution. In some cases, data is also collected to support federation playbacks. Essential federation data may be collected via databases in the federates themselves, or can be collected via specialized data collection tools directly interfaced to the RTI. The particular strategy for data collection in any particular federation is entirely at the discretion of the federation development team.

For secure federations, strict attention must be given to maintaining the security posture of the federation during execution. A clear concept of operations, properly trained security personnel, and strict configuration management will all facilitate this process. It is important to remember that authorization to operate (accreditation) is usually granted for a specific configuration of federates. Any change to the federates or federation composition will certainly require a security review, and may require some or all of the certification tests to be redone.

3.10 Results

The Results phase of federation development is focused on the analysis of execution outputs. The principal activity in this phase is to apply statistical measures (if appropriate) and other data reduction methods to transform raw data into derived results. Errors estimates due to inaccuracies in measurement and sampling should be accounted for during analysis of the data. Commercial or government off-the-shelf (COTS/GOTS) statistical analysis tools and other post-processing tools are generally very useful during data analysis/reduction.

3.11 Feedback

The Feedback phase is composed of two main activities. In the first activity, the derived results from the previous phase are evaluated to determine if all federation objectives have been met. This requires a retracing of execution results to the measurable set of federation requirements originally generated during Conceptual Analysis (and refined in subsequent phases). In the vast majority of cases, any impediments to fully satisfying federation requirements have already been identified and resolved much earlier during the FOM development and federation integration phases. Thus, for well-designed federations, this activity is merely a final check. In those rare cases in which certain federation objectives may not been fully met at this late stage of the overall process, corrective actions must be identified and implemented in whatever previous phase of the FEDEP such actions are most appropriate and results regenerated.

The second activity in this phase, assuming all federation objectives have been achieved, is to store all reusable federation products in the Modeling and Simulation Resource Repository (MSRR). At a minimum, this would include storing the FOM and any modifications to the SOMs of federation participants in the OML. However, there are several other federation products which may also be reusable, such as new OMDD entries, the federation scenario description, and the federation conceptual model. In fact, it may be advantageous in some instances to capture the full set of federation products required to reproduce the federation execution. Determination of which federation products have potential for reuse in future applications is at the discretion of the federation development team.

4. CONCLUSION

This document has provided one view of the federation development process. Currently, this model represents the best practices available to the HLA community. The FEDEP is a highly tailorable model, and is offered as guidance to HLA federation developers. As additional experience is accrued in building HLA applications, the FEDEP will leverage this knowledge and evolve accordingly.

In the longer term, the FEDEP may also serve as a framework for the development of alternative, more highly detailed views of the federation development process which may better satisfy the needs of specific communities. Such views can provide implementation level guidance to “hands-on” federation builders without the need to interpret and customize the more generalized FEDEP activity descriptions to the particular domain. Federation developers are encouraged to perform these types of adaptations whenever appropriate.

Acronyms

COTS	Commercial Off-The-Shelf
CMMS	Conceptual Models of the Mission Space
DMSO	Defense Modeling and Simulation Office
DoD	Department of Defense
FED	Federation Execution Data
FEDEP	Federation Development and Execution Process
Fedex	Federation Execution
FOM	Federation Object Model
GOTS	Government Off-The-Shelf
HLA	High Level Architecture
M&S	Modeling & Simulation
MSRR	Modeling and Simulation Resource Repository
OM	Object Model
OMDD	Object Model Data Dictionary
OMDT	Object Model Development Tool
OML	Object Model Library
OMT	Object Model Template
OO	Object Oriented
RID	RTI Initialization Data
RTI	Runtime Infrastructure
SOM	Simulation Object Model
VV&A	Verification, Validation, and Accreditation

References

[DOD95] Department of Defense, Under Secretary of Defense (Acquisition and Technology) (USD (A&T)), *DoD Modeling and Simulation (M&S) Master Plan*, Washington, DC, October 1995.

[SIW97] Defense Modeling and Simulation Office, *HLA Object Model Development: A Process View*, March 1997.

Comments

Comments on this document should be sent by electronic mail to the Defense Modeling and Simulation Office HLA mailing address (hla@msis.dmso.mil). The subject line of the message should include the FEDEP section number referenced in the comment. The body of each submittal should include (1) the name and electronic mailing address of the person making the comment (separate from the mail header), (2) reference to the portion of this document that the comment addresses (by page, section number, and paragraph number), (3) a one-sentence summary of the comment and/or issue, (4) a brief description of the comment and/or issue, and (5) any suggested resolution or action to be taken.